



# PATENT SPECIFICATION

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## PROVISIONAL SPECIFICATION

### Improvements in Textile Printing Processes.

We, GEORGE TRAPP DOUGLAS and SIMON THOMSON McQUEEN, both of Hexagon House, Blackley, Manchester, British Subjects, and IMPERIAL CHEMICAL INDUSTRIES LIMITED, of Imperial Chemical House, Millbank, London, S.W.1, a Company incorporated under the laws of Great Britain, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to improvements in printing processes and more particularly to improvements in processes for printing textile materials by producing azo dyestuffs on the fibre.

15 In the printing of textile materials with printing pastes comprising stabilised diazo compounds and coupling components, various processes for developing the azo dyestuff on the fibre have been used. The printing 20 textile material has for example been passed into a hot bath containing a feeble acid or has been exposed to the action of steam mixed with a volatile acid. In the former process the components of the dyestuff mixture are partially removed when the textile 25 is immersed in the hot acid bath and the dyestuff mixture is thus not completely utilised for forming azo dyestuff on the fibre. In the latter process considerable difficulties 30 are experienced in practice since the steaming apparatus which is generally constructed of iron is strongly corroded by the acid steam.

The above difficulties have been largely 35 avoided in the past by printing the textile material, drying and then padding with an acid solution and again drying.

It has also been proposed in British Specification No. 466,846 to treat the textile 40 material with an acid or acid compound or a compound yielding acid by hydrolytic or thermal dissociation, for example an ester of an organic acid, such as diethyl tartrate, and then to dry the material before applying 45 the printing paste.

We have now found that the pretreatment or after-treatment of the textile material with an acid or acid-yielding sub-

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stance and subsequent drying can be avoided by adding to the printing paste a suitable 50 quantity of an ester of an aliphatic acid. By this method considerable simplification of the printing process is achieved.

According to our invention we provide a process for printing textile materials with a 55 paste comprising a stabilised diazo compound, a coupling component, an amine which is capable of dissolving the stabilised diazo compound and the coupling component and an ester of an aliphatic acid 60

The stabilised diazo compound may be 60 anti-diazotates such as for example the anti-diazotates of o- or p-nitroaniline, 2-nitro-4-chloroaniline or 2:4-dichloroaniline or they may be diazoamine or diazoimino compounds 65 (triazenes) such as for example the triazenes from 4-chloro-2-toluidine, 4-chloro-2-aminoanisole or 4-benzoylamino-5-methyl-2-methoxy-aniline and sarcosine, 4-benzoylamino-2:5-diethoxyaniline or 5-chloro-2-aminotoluene 70 and methyl taurine, 2:5-dichloroaniline or 2-amino-5-nitro-toluene and 2-ethylamino-5-sulphobenzoic acid. The coupling component may be any compound capable of reacting 75 with a diazo compound to produce an azo dyestuff on the fibre but the arylamides of 2:3-hydroxynaphthoic acid such as for example the o-phenetidine thereof and the arylamides of acetoacetic acid such as for 80 example di(acetoacet)-o-tolidide are particularly suitable for use in the process of the invention.

The amine capable of dissolving the stabilised diazo compound and the coupling component may carry substituents on the 85 nitrogen atom and may be a hydroxyamine such as for example diethylaminoethanol.

As suitable esters of aliphatic acids there may be mentioned for example diethyltartrate. The quantity of such substances 90 present in the printing paste should preferably be between 0.1% and 2% since with smaller quantities, the quantity of acid contained in the subsequent steaming process may be insufficient to develop the dyestuff on 95 the fibre, and with larger quantities, preci-

*acid form used in heating process*

The paste so obtained is printed on cotton fabric, which is then dried and aged in an atmosphere of steam at 100-102°C. for 15 minutes. The printed fabric is rinsed in water, soaped in a solution of 0.2% soap, again rinsed in water and dried. A full bright yellow pattern is obtained on the cotton fabric.

## EXAMPLE 2.

10 6 parts of a mixture of the o-phenetidine of 2-hydroxy-3-naphthoic acid and the triazene obtained from 4-chloro-2-toluidine and sarcosine are dissolved in a mixture of 14 parts  $\beta$ -diethylaminoethanol, 3.4 parts 15  $\beta\beta'$ -dihydroxydiethylsulphide, 0.6 parts diethyltartrate and 16 parts water, and 60 parts of 8% gum tragacanth thickening are then added.

The paste so obtained is printed on cotton 20 fabric, which is then dried and aged in an atmosphere of steam at 100-102°C., rinsed in water, soaped at the boil in a 0.2% solution of soap, again rinsed in water and dried. A brilliant scarlet printed pattern is obtained 25 on the fabric.

## EXAMPLE 3.

8 parts of a mixture of the o-phenetidine of 2-hydroxy-naphthoic acid and the anti-diazotate of 2:4-dichloroaniline are dissolved in a mixture of 12.5 parts  $\beta$ -diethyl- 30 aminoethanol, 0.5 parts diethyltartrate and 19 parts water and 60 parts of 8% gum tragacanth thickening solution are then added.

The paste so obtained is printed on viscose 35 rayon fabric, the fabric is then dried, aged for 15 minutes in an atmosphere of steam at 100-102°C., rinsed in water, treated in a 0.2% solution of soap at 80°C. for 5 minutes, again rinsed, and dried. A full bright yellow- 40 ish scarlet shade is obtained.

## EXAMPLE 4.

In place of the 0.5 part of diethyl tartrate used in Example 1, there is used 0.5 part di-isopropyl tartrate. A similar yellow print 45 is obtained.

## EXAMPLE 5.

In place of the 0.6 part of diethyl tartrate used in Example 2, there is used 0.6 part of ethyl lactate. A similar scarlet print is 50 obtained.

## EXAMPLE 6.

In place of the 0.5 part of diethyl tartrate used in Example 3, there is used 0.5 part of dimethyl succinate. A similar yellowish 55 scarlet print is obtained.

## EXAMPLE 7.

In place of the 3.4 parts of  $\beta:\beta'$ -dihydroxydiethylsulphide used in Example 2, there are used 3.4 parts of ethylene glycol. A similar scarlet print is obtained. 60

## EXAMPLE 8.

In place of the 14 parts of  $\beta$ -diethylaminoethanol used in Example 2, there are used 14 parts of morpholine. A similar scarlet 65 print is obtained.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Process for printing textile materials 70 with a paste comprising a stabilised diazo compound, a coupling component, an amine which is capable of dissolving the stabilised diazo compound and the coupling component, and an ester of an aliphatic acid.

2. A composition suitable for printing textile materials which comprises a stabilised 75 diazo compound, a coupling component, an amine which is capable of dissolving the stabilised diazo compound and the coupling 80 component, and an ester of an aliphatic acid.

3. A composition according to Claim 2 wherein the amine is  $\beta$ -diethylaminoethanol and the ester of an aliphatic acid is diethyl 85 tartrate.

4. A process for printing textile materials as hereinbefore particularly described and ascertained especially with reference to the foregoing Examples.

Dated the 24th day of September, 1947.

E. A. BINGEN,

Solicitor for the Applicants.